Licensable Technologies

Thermoacoustic Natural Gas Liquefier

Applications:

- Onshore and offshore LNG production
- Temporary production from new fields awaiting pipeline construction
- Recovery and liquefaction of coal bed methane and landfill gases
- Can be used to produce LNG for heavy vehicles

Benefits:

- Simplicity of production
- Reliability
- No moving parts
- Can be manufactured in central location and transported to site

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Summary:

Natural gas currently provides a quarter of America's energy supply. Cryogenic liquefaction of gas allows it to be shipped economically where pipelines do not exist, because liquefied natural gas (LNG) is nearly as dense as petroleum.

A sound wave in a gas consists of coupled pressure and velocity oscillations. Temperature oscillations always accompany the pressure oscillations. The combination of these oscillations and their interactions with nearby solids produces a variety of "thermoacoustic" effects. Los Alamos National Laboratory has brought a thermodynamic viewpoint and unprecedented power to thermoacoustics and has teamed with a series of partners to apply it to combustion-powered cryogenic liquefaction for natural gas.

Development Stage:

A 1/40-scale system has been built and tested in collaboration with Praxair, Inc.

Patent Status:

The key aspects of the thermoacoustic technology are patented. The intellectual property portfolio in this technology consists of 10 issued patents.

Licensing Status:

Available for exclusive and non-exclusive licensing. The Laboratory is currently seeking a new partner or partners to assist with the final stage of development.

Sketch by Stork Engineers and Contractors, 2000

Top: The "500 gallon/day" thermoacoustic liquefier at Praxair-Denver, with the burner on top and the water and liquefied-natural-gas plumbing visible near the base.

Bottom: Concept showing an array of 20,000-gallon/day thermoacoustic natural-gas liquefiers on a two-hull floating offshore oil- and gas-production facility. Six thermoacoustic units separate natural-gas liquids on one hull and 16 units liquefy the gas for temporary storage on the second hull for weekly shipment to shore.

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